

Abhay Kumar, M.D.

6431 Fannin St,
MSB 7.154,
Houston, TX 77030

June 19, 2019

Tom Jacob
7500 Rialto Blvd,
Bldg. Two, Ste 250
Austin, TX 78745

Re: Byrd Stroke Case

Dear Mr. Jacob:

I am writing to detail my opinions in Mr. Tommy Byrd's (DOB: 5/13/58) medical case. I have reviewed the following medical records:

- Atlanta VAMC
- Imaging, including MRI.

My background is as a stroke and neurocritical care neurologist. I am currently Attending Neurocritical Care Neurologist at Memorial Herman in Houston, Texas. I am board certified by the American Board of Psychiatry and Neurology, and in Neurocritical Care by the United Council of Neurologic Subspecialties. I am licensed in Missouri, Texas, and Illinois. For a full review of my qualifications, publications, lectures, and other credentials, please refer to my CV, which I am incorporating into this letter.

All the opinions I express below are to a reasonable degree of medical certainty. I reserve the right to supplement my opinions if additional questions are asked of me.

Medical Timeline

Tommy Byrd was a 58-year-old gentleman who, on November 15, 2016 at 0821, underwent a lumbar laminectomy with partial medial fasciectomy and foraminotomies, at L2-L3, L3-L4, and L4-L5. (NTL1437) His surgery was

uncomplicated and he was taken to ICU for recovery. Mr. Byrd's post-surgical progress notes state that he is at risk for deep vein thrombosis, but at the time of the note (1606, Nov 15), "Patient is free of deep vein thrombosis." (NTL1432) His post-operative condition was noted as stable without complications. (NTL1430)

At 1816 on Nov 15, a post-surgical nursing note stated that anesthesia started at 0821 and ended at 1654. (NTL1427)

At 1842, staff physician Dr. McIntosh took Mr. Byrd's vitals and examined him. (NTL1426-27) Mr. Byrd was awake with minimal pain. She indicated that there were no complications and that the patient had recovered from the immediate effects of anesthesia. One would expect that if, at this time, Mr. Byrd was delirious, she would have noted that or any other abnormal symptomology. The entry date of this note is 18:46:26 and the note was signed by the doctor at 18:43.

The entry date of the next note in the records is 18:46:07 and was signed on 18:49. (NTL1426) Sometime between 1843 and 1846, Dr. Craig Jabaley found Mr. Byrd and noted:

58 y/o male s/p lumbar laminectomy and fusion. Was passing through the ICU when I found the patient confused and agitated with our nurses attempting to reorient him. Brief exam revealed obvious features of hyperactive delirium. Patient not redirectable, unable to comprehend need for treatment and bedrest after spine surgery. Complained of back pain and pain 2/2 Foley catheter. Delirium addressed to good effect with Haldol 4mg IV x1. Pain addressed to good effect with Dilaudid 1mg IV xl. Patient currently comfortable and cooperative with staff. Primary team notified by the ICU staff.

Will follow-up in the AM.

(NTL1426)

At 1907, a nursing note indicated that Mr. Byrd was "agitated, disoriented to the environment and attempting to get out of bed, clutching penis and says 'I have to pee' 'I have to go'," and that the patient was tachycardic and hypertensive. (NTL1426) An EKG was performed at 1852. (NTL1447) It revealed sinus tachycardia, probable left atrial abnormality, and left ventricular hypertrophy with secondary repolarization abnormality.

At 1921, Dr. Sivakumar (medical resident PGY1) saw Mr. Byrd and also noted that he was experiencing hyperactive delirium. After examining and reviewing the EKG, he concluded that Mr. Byrd's likely secondary to post-op anesthesia. This record does not have a supervising physician who reviewed or signed off on the diagnosis and plan.

A nursing note at 2020 shows continued cognitive issues: restless and anxious, attempting to get out of bed, pull out lines, and oriented to name only. (NTL1420). The nurse noted weakness with gait. (NTL1422) This note had the following addendums, from that night (and morning of Nov 16, 2016):

- At 0344 am, the next day, an addendum to this note stated "pt remains confused, uncooperative."
- At 0356, "also more tachycardia and hypertensive...MD unable to assess pt."
- At 0418, "MD and Ortho on call notified of pt's continued agitation/confusion and tachycardia/htn."
- At 0458, "Pt remains confused, restless and agitated. Attempting to get oob and pulling at lines. Unable to reorient or redirect." The VA police were called to help restrain the patient.
- At 0505, Mr. Byrd is now oriented to name and place.
- At 0819, Mr. Byrd is awake, calm and cooperative. Oriented x3.

At 2308 on Nov 15, 2016, a nursing intervention note stated that Cardiology had recommended a nursing focus on dysrhythmias, with continuous cardiac monitoring as well as monitoring mental status, blood pressure, heart rate, and activity tolerance. (NTL1418) However, I cannot find usage of any Holter monitoring. His note indicates that the providers at the VA were considering cardioembolic causes of Mr. Byrd's altered mental state.

At 0753 on Nov 16, 2016, given Mr. Byrd's overnight issues, psychiatry was consulted. (NTL1402) At 840, Dr. Presciutti noted that Mr. Byrd was still confused but answers questions appropriately. (NTL1404)

Another EKG was also performed on Mr. Byrd. (NTL1448) It was interpreted as abnormal, with sinus tachycardia and probable left ventricular hypertrophy with secondary repolarization abnormality.

At 0812, Dr. Dolber, a psychiatry resident PGY2, entered a note:

58M with undocumented psych history admitted for lumbar laminectomy, s/p surgery yesterday afternoon, consulted for agitation. Pt has been disregarding commands and trying to pull out his lines and drains since he woke up from anesthesia around 6:30 pm yesterday. He was given 4 mg Haldol IM at 6:45 pm, 2 mg Ativan at 8 pm, and 2.5 mg Haldol at 12:30 pm. On interview he is restless, oriented to self and type of building only, and ignores other questions; he asks repeatedly to have his soft restraints removed....Per remote charts, his only psychiatric diagnosis is "depression," but his outpatient medications include citalopram, nortriptyline, trazodone, Depakote, and Geodon. Other than Geodon, his other medications were held earlier as he was NPO. His girlfriend of 4 months is present but does not know anything about his psychiatric history.

(NTL1397) Multiple notes at this point referenced that Mr. Byrd was too sedated to do a proper examination.

At 1341, a physical therapy note states that it is difficult to understand the patient due to "mumbling" and "unable to give clear answer." (NTL1389) The session had to be discontinued because Mr. Byrd was too confused.

Mr. Byrd continued to have confusion problems. On Nov 17, 2016 at 1025, a social work note stated that Mr. Byrd was confused and did not know who he was talking to. (NTL1371)

On Nov 18, 2016 at 1110, Mr. Byrd was still confused, not cooperating or following commands. (NTL1361) At 1148, Patient inconsistent with his alertness/involvement. Patient continues with erratic with behavior and movements. (NTL1360)

On Nov 19, 2016 at 0801, the notes described Mr. Byrd as having intermittent confusion and agitation. (NTL1359)

Multiple times in the record, it shows that Mr. Byrd was experiencing gait/leg weakness:

- Nov 15, 2016 at 2020 – (NTL1422)
- Nov 16, 2016 at 0630 – (NTL1413)
- Nov 16, 2016 at 2030 – (NTL1379)
- Nov 17, 2016 at 2015 – (NTL1367)

- Nov 18, 2016 at 2236 – (NTL1357)
- Nov 19, 2016 at 0800 – (NTL1354)
- Nov 19, 2016 at 2248 – (NTL1350)
- Nov 20, 2016 at 1903 (NTL1348) forgetfulness & gait unsteady, weak
- Nov 20, 2016 at 2315 (NTL1341)
- Nov 21, 2016 at 0805 (NTL1336)
- Nov 21, 2016 at 2039 (NTL1328) unsteady gait and unpredictable behavior

Then, on Nov 22, 2016 at 1101, a Code 44 was called because Mr. Byrd was confused, unable to say why he was admitted, and disoriented. (NTL1319) By 1208, his gait was described as impaired. (NTL1316)

At 1432, a psychiatric note was entered. It stated that Mr. Byrd was confused, disoriented, and slurring his words. (NTL1308). The assessment was “Delirium secondary to another general medical condition.” The recommendation included, “Could consider neurological evaluation given teams report of sudden acute mental status change.”

At 1457, another EKG was performed on Mr. Byrd. (NTL1449) His EKG continued to be interpreted as abnormal, with tachycardia, probable left atrial abnormality, and probable left ventricular hypertrophy with secondary repolarization abnormality.

At 1623, a neurologist, Dr. Schultz (Resident PGY2) saw Mr. Byrd. However, without doing imaging, the resident concluded that Mr. Byrd’s condition was related to his medications and not a stroke. (NTL1305) The resident stated that no neurologic imaging indicated at this time.

On Nov 23, Mr. Byrd received another neurology consult from Dr. Schultz. (NTL1282). Finally, an MRI of the brain without contrast was ordered. No MRI was performed until Nov 25, 2016 at 1220. The MRI discovered findings that were consistent with acute to subacute subtotal middle cerebral artery territory stroke. (NTL1107) After reviewing the MRI, the neurology resident stated:

58 y/o man with acute change in mentation found to have a left posterior middle cerebral artery (MCA) stroke with proximal M2 cutoff. This fits with his aphasia and subtle right sided weakness, which was Haldol wore off. Mechanism is cryptogenic at this receptive> expressive much more apparent after point although suspect cardioembolic. Degree of comprehension impairment is significant. Recommend to complete stroke evaluation as below.

(NTL1242-43)

Analysis

After reviewing the medical records, I am confident to a reasonable degree of medical certainty that the providers at the Atlanta VAMC fell below the standard of care and these deviations caused permanent neurological injury to Mr. Byrd.

It is incumbent on providers to rule out life threatening causes of diseases. In Mr. Byrd's case, instead of immediately diagnosing delirium, the providers should have considered the totality of Mr. Byrd's presentation and considered and ruled out other medical problems, including stroke. Even though Mr. Byrd didn't have complete paralysis from the outset, he was eventually found to have a stroke affecting the language centers of his brain. It is very likely that when he was disregarding commands per the documented notes, he was unable to comprehend and in repeating himself over and over, he demonstrated inability to carry out a conversation. A broad differential should have been used at this point to consider not only delirium, but also other organic/neurological causes for his presentation. To work up this scenario, brain imaging (CT scan of the brain followed by brain MRI if needed) should have been done soon after symptom onset.

Delirium is a well reported phenomenon in neurosurgical patient population with predictive risk factors being prolonged length of ICU stay, abnormal sodium values preceding delirium, a new postoperative infection, and the presence of a neurological deficit. *Morshed, RA et al. World Neurosurg. 2019 Mar 11. pii: S1878-8750(19)30624-2*. With onset of symptoms observed soon after recovery from anesthesia and persisting for several hours, the evaluation of this patient should have included consideration of a multitude of factors and not simply ascribed to this being postoperative in nature only. In case of this patient, who had just been admitted to the hospital after his surgery without any obvious electrolyte abnormality and no obvious signs of infection, a new neurological deficit i.e., stroke should have been strongly and expediently been considered.

Delirium is a documented symptom of stroke. The average duration of delirium is 4 days after an ischemic stroke and 3 days after a hemorrhagic stroke. Dostoviæ, Zikrija, et al. "Duration of delirium in the acute stage of stroke." *Acta Clin Croat* 48.1 (2009): 13. Indeed:

Delirium is a common neurological manifestation in elderly patients hospitalized because of a general medical condition. The

presence of delirium early after admission for an acute stroke represents a diagnostic dilemma and aggravates the family distress.... These findings have practical implications for the management of stroke patients who have development of delirium within 10 days after admission. Clinicians are encouraged to use validated tools to identify early signs of delirium and to recognize modifiable risk factors related to delirium. Early screening for delirium and the identification of a metabolic or infectious condition should prompt the appropriate treatment and consequently improve clinical outcomes.

Shi, Qiyun, et al. "Delirium in acute stroke: a systematic review and meta-analysis." *Stroke* 43.3 (2012): 645-649.

It is evident that providers didn't regard Mr. Byrd's postoperative mentation changes as particularly urgent and relating to an underlying acute neurological etiology, i.e., stroke when it should have been otherwise. The standard of care also required consultation with a neurologist. Had providers consulted a reasonable neurologist post-operatively, they would have, more likely than not, ordered imaging. It is standard of care for a patient like Mr. Byrd under similar circumstances to have imaging to rule out stroke. If providers had administered Mr. Byrd an MRI, more likely than not, the MRI would have shown the early injury to his brain. The MRI would either show evidence of occluded MCA (known as hyperdense MCA sign), or it would show the edema or other early ischemic changes to the brain as a result of the MCA occlusion.

Eventually, by Nov. 22nd, neurology was consulted. Neurology was represented by a neurology resident, not a faculty member. In fact, the faculty member doesn't sign the chart until the next day. And it was noted that Mr. Byrd was slurring his speech at this point. Given the slurred speech and the history of neurologic complaints between his surgery and Nov 22, it was incumbent on neurology to order an emergent MRI to rule out stroke. This was not done and it was a violation of the standard of care. It still wasn't considered an emergency. At this time, strokes are regarded as an emergency.

Once a diagnosis of delirium has been established, the potential cause—in particular, any life-threatening contributors—must be determined. Delirium should be considered to be a medical emergency until proven otherwise.... Basic medical care, including airway protection, assessment of vital signs, and laboratory tests to exclude treatable conditions such as infections, should be

administered. Neuroimaging is performed in selected patients to exclude a focal structural abnormality, such as an acute stroke, that might mimic delirium in its presentation.

Fong, Tamara G., Samir R. Tulebaev, and Sharon K. Inouye. "Delirium in elderly adults: diagnosis, prevention and treatment." *Nature Reviews Neurology* 5.4 (2009): 210.

The fact that neurology ordered an MRI indicates they were concerned for stroke, but again, the MRI was not provided on any emergent basis.

We know that had the providers at the VAMC intervened, more likely than not, Mr. Byrd's brain function could have been preserved. The description of the clot—present in proximal part of the second division of middle cerebral artery—means that it would have been accessible to extraction by an interventional procedure. For the lack of any intervention, Mr. Byrd suffered due to extensive involvement of damaged territories supplied by the posterior division of the middle cerebral artery including the temporal lobe, which makes sense because the patient has trouble expressing and comprehending language.

If the providers procured the images with urgency, mechanical thrombectomy to extract the aforementioned clot could have been done. Mechanical thrombectomy has been proven in peer reviewed trials to be effective at preserving brain function in appropriately considered patients. Nogueira, Raul G., et al. "Thrombectomy 6 to 24 hours after stroke with a mismatch between deficit and infarct." *New England Journal of Medicine* 378.1 (2018): 11-21.

Conclusion

Please do not hesitate to contact me if you have any questions about this case. I believe the analysis I have conducted and authorities cited are reliable, but I reserve the right to revise or update my opinion if I receive new information. All of the opinions I have reached in this case are to a reasonable degree of medical certainty unless otherwise noted. I also reserve the right to expound on these opinions should I be asked new or different questions.

Sincerely,

A handwritten signature in black ink, appearing to read 'Abhay Kumar', with a stylized flourish at the end.

Abhay Kumar, M.D.